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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/085,498	02/26/2002	Woo Sik Yoo	M-11549 US	8701

7590 04/06/2004

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EXAMINER	
JOLLEY, KIRSTEN	

ART UNIT	PAPER NUMBER
1762	

DATE MAILED: 04/06/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/085,498	YOO, WOO SIK	
	Examiner	Art Unit	
	Kirsten C Jolley	1762	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 January 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-31* is/are pending in the application.

4a) Of the above claim(s) *21-31* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-31 are pending in the application. Claims 21-31 are withdrawn from further consideration, without traverse, pursuant to 37 CFR 1.142(b) as being drawn to a nonelected method and apparatus, there being no allowable generic or linking claim.

Response to Arguments/Amendments

2. Applicant's arguments with respect to claims 1-20 have been considered. The rejections over the prior art of Yen have been withdrawn in response to Applicant's amendments to independent claims 1 and 12 requiring that the heating steps are performed "at about atmospheric pressure." In response to Applicant's amendments, the claims are newly rejected over the previously-cited prior art of Yang as set forth below. It is additionally noted that the new limitation of "at about atmospheric pressure" appears to be new matter, as discussed in the 35 USC 112, 1st paragraph rejection below.

3. It is noted that claims 7 and 9 claim the same subject matter.

4. Additionally, it is noted that the Angstrom symbol in claims 3 and 14 (present in the originally-filed claims) is missing.

Specification

5. The abstract of the disclosure is objected to because it is still directed to the non-elected inventions. The Abstract describes a process of forming an oxide layer through the combustion of a process flame as described in paragraphs [0024] to [0042] of the specification. By contrast,

the claims are directed to a different embodiment of the specification, described in paragraphs [0043] to [0053], involving the use of first lower-temperature and second higher-temperature heating steps to form an oxide layer. Correction is required. See MPEP § 608.01(b).

Claim Rejections - 35 USC § 112

6. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

7. Claims 1-20 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The newly added limitation in steps (b) and (c) of claims 1 and 12, and in claim 13, requiring that heating is performed "at about atmospheric pressure" appears to be new matter.

Paragraphs [0043] to [0053] of the specification describe the elected method that is claimed in claims 1-20. The Examiner could not locate disclosure of performing the heating steps in this embodiment at about atmospheric pressure. It is noted that paragraph [0026] of the specification discloses use of a reactor process chamber which "can accommodate" a wide range of internal pressures inclusive of atmospheric pressure, however citing reactor specifications is not a positive recitation that the claimed first and second heating steps are performed at about atmospheric pressure. If Applicant can locate disclosure of this limitation in the specification,

then they should state the location of the limitation on the record and the Examiner will withdraw the rejection.

8. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

9. Claims 13-14 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 13 remains vague and indefinite because it is not clear whether the phrase "said first layer of SiO_2" in line 2 refers to the layer of SiO_2 formed at the end of first heating step (b) of claim 12 or the cured layer of SiO_2 formed at the end of second heating step (c). The specification teaches at paragraphs [0050] and [0052] and in Figure 4 that a second layer of SOG can be applied over the first layer of SiO_2 after either heating step (a) or heating step (b), therefore it is not clear from a reading of the specification to which layer of SiO_2 from claim 12 claim 13 refers. For the purpose of examination, the Examiner has broadly interpreted claim 13 as reading on applying a second layer of SOG on top of *either* an outgassed SiO_2 layer produced by heating step (b) *or* a hardened SiO_2 layer produced by heating step (c). (It is additionally noted that paragraph [0011] of the specification teaches that a layer of SiO_2 is formed afater the first outgassing step.)

Claim 14 is similarly vague and indefinite because it is not clear whether the phrase "said first layer of SiO_2" in line 1 refers to the layer of SiO_2 formed at the end of first heating step (b) of claim 12 or the hardened layer of SiO_2 formed at the end of second heating step (c). It is not

clear from paragraphs [0047] or [0050] in the specification which SiO_2 layer is being referred to (the outgassed layer or the hardened layer) as having the claimed thickness, and therefore one skilled in the art would not know if they were infringing the claim. For the purpose of examination, the Examiner has broadly interpreted claim 14 as reading on applying *either* an outgassed SiO_2 layer produced by heating step (b) *or* a hardened SiO_2 layer produced by heating step (c) to the claimed thickness.

Additionally in both claims 13 and 14, it is noted that there is not antecedent basis for the phrase "said first layer of SiO_2" in line 2.

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

11. Claims 1, 3-9, 12, and 14-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yang (US 5,500,243).

As to claims 1, 7-9, and 12, Yang discloses a method for forming an oxide layer comprising the steps of: applying a spin-on-glass (SOG) coating material to a substrate to form a first layer (col. 1, line 61 to col. 2, line 19); heating said first layer to a first temperature for a first time duration to remove substantially all the solvents by evaporation (col. 2, lines 27-34); and heating said layer to a second process temperature for a second time duration to cause the SiO_2 layer to harden (col. 2, lines 34-39). The first heating step of Yang necessarily causes its

coating layer to outgas since the materials and process steps of Yang are materially similar to those claimed by Applicant and taught in the instant specification.

Yang discloses the claimed heating steps, however Yang lacks a specific teaching that the pressure used during heating is about atmospheric pressure. It would have been obvious for one having ordinary skill in the art to have performed the method of Yang at atmospheric pressure since Yang lacks a teaching of using pressures other than atmospheric pressure and because atmospheric pressure is the simplest and most economical pressure to use in terms of equipment and material needs, power supply, etc.

As to claims 3 and 14, Yang teaches that the resulting thickness of the layer is 0.5 microns (col. 2, lines 25-27).

As to claims 5-6 and 16-17, Yang teaches that the first temperature is preferably 250-330 C and the second temperature is in the range of 900-1100 C (col. 2, lines 31-32 and 38-39). These ranges are within Applicant's claimed ranges.

As to claims 4 and 15, Yang is silent with regard to the lengths of time of heating. The length of time of heating coating materials is well known to be cause-effective depending upon a number of factors including the thickness of the coating layer, the particular materials used, the heating temperatures used, the viscosity of the coating material, and the desired qualities of the product. It is well settled that determination of optimum values of cause effective variables such as these process parameters is within the skill of one practicing in the art. *In re Boesch*, 205 USPQ 215 (CCPA 1980).

12. Claims 2, 11, 13, 19, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yang (US 5,500,243) as applied to claims 1, 3-9, 12, and 14-17 above, and further in view of Ouellet (US 5,470,798).

With respect to claims 2, 11, 13, and 20, Yang lacks a teaching of performing each of claimed steps (a), (b), and (c) and then repeating each of steps (a), (b), and (c) to apply and heat treat a second SOG layer on top of the hardened SiO_2 layer. Ouellet is cited for its similar teachings of applying a SOG coating material to a substrate and subjecting the coating layer to a curing process whereby the coating polymerizes and causes release of water, solvent, and alcohol (col. 1, lines 16-18). Ouellet teaches that the coating and curing steps are repeated up to three or more times until a sufficient film thickness has been achieved (col. 1, lines 60-64). It is the Examiner's position that it would have been obvious to one having ordinary skill in the art, upon seeing the prior art of Ouellet, to have repeated each of the coating, first heat treatment, and second heat treatment steps of Yang in order to achieve a desired film thickness with the expectation of successful results because Ouellet and Yang are similarly directed to coating and curing SOG coatings. The test of obviousness is not express suggestion of the claimed invention in any or all references but rather what the references taken collectively would suggest to those of ordinary skill in the art presumed to be familiar with them. *In re Rosselet*, 347 F.2d 847, 146 USPQ 183 (CCPA 1965); *In re Hedges*, 783 F.2d 1038.

As to claim 19, Yang teaches applying its SOG coating by spin coating. Yang lacks a teaching of applying its SOG coating by dipping. Ouellet teaches that SOG coating material can be applied by any of a number of methods in its invention such as spin coating, immersion, or spraying (col. 8, lines 18-21). It would have been obvious to one having ordinary skill in the art,

upon seeing the prior art of Ouellet, to have coated the SOG coating material in the process of Yang by immersion instead of spin coating with the expectation of similar results because Ouellet teaches the equivalence of both coating techniques in a SOG coating process. Again, it is noted that the test of obviousness is not express suggestion of the claimed invention in any or all references but rather what the references taken collectively would suggest to those of ordinary skill in the art presumed to be familiar with them.

13. Claims 1, 3-10, 12, and 14-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyashita et al. (US 5,380,608) in view of Yang (US 5,500,243).

Miyashita et al. discloses a process for making a photomask, whereby Miyashita et al. teaches use of a quartz substrate 50 on which is formed an etching stopping layer 51 followed by transparent film 52 (see Figure 2a and col. 8, lines 37-57). Miyashita et al. teaches at col. 8, lines 49-53, that transparent film 52 is preferably a film of high-purity SiO_2 and may be provided by a coating procedure such as spin-on-glass coating where siloxane is spin-coated and heated to form a SiO_2 film. One skilled in the art would have been motivated to look to the prior art for more information and a detailed method of applying SOG coatings to a substrate and heating the coating to form a SiO_2 layer.

Yang discloses a method of applying a SOG coating by spin coating and conducting first and second heat treatments to convert the SOG coating to a SiO_2 film having a planar surface. It would have been obvious to one having ordinary skill in the art to have used the process of Yang to form transparent SiO_2 film 52 in the process of Miyashita et al. with the expectation of successful results because Miyashita et al. is silent with regard to the specifics of a SOG process

to be used in its invention to form transparent film 52 and Yang teaches an exemplary SOG coating and curing process for producing SiO_2 films with high planarity. Additionally, one having ordinary skill in the art would have been motivated to use the process of Yang to apply and cure its SOG coating because Yang teaches producing a cured SOG/SiO_2 film having good planarity and improved hardness and wear resistance properties.

With respect to claims 1, 3-9, 12, and 14-17, Yang is applied for the reasons discussed in section 9 above.

With respect to claims 10 and 18, the process of Miyashita et al. uses a quartz substrate.

14. Claims 2, 11, 13, 19, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyashita et al. in view of Yang as applied to claims 1, 3-10, 12, and 14-18 above, and further in view of Ouellet (US 5,470,798).

Claims 2, 11, 13, 19, and 20 are further rejected in view of Oullet for similar reasons as discussed above in section 10.

Conclusion

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

16. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kirsten C Jolley whose telephone number is 571-272-1421. The examiner can normally be reached on Monday to Thursday and every other Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shrive P Beck can be reached on 571-272-1415. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Kirsten C Jolley
Patent Examiner
Art Unit 1762

kcj